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Small Farms Research News

USDA, ARS, SPA

Fall 2000 2nd Edition

Center Completes First Newsletter

Dale Bumpers Small Farms Research Center History

The establishment of a quarterly newsletter represents just another page in the ongoing history of the Research Center. The aim of this newsletter is to inform farmers, ranchers, and landowners of recent results from experiments at the DBSFRC in Booneville AR and by the Center's cooperators. For a large part of the twentieth century Booneville, AR was known as the site of a tuberculosis sanitarium. The sanitarium had an expansive acreage that supplied food products and other natural resources to occupants and workers. By the 1970's, there was no longer a need for the sanitarium, and the Booneville community was wondering what would become of these resources once used by the sanitarium. Between 1976 and 1981, the Arkansas Department of Corrections occupied part of the sanitarium's land.

In early 1976, the Booneville Chamber of Commerce appointed a select committee to study how best to utilize the lands that once comprised the sanitarium. By the end of 1976, the committee had secured from the Western Arkansas Planning and Development District a study and a recommendation as to the best usage of this acreage. The number one

priority was a Small Farms Research Center. The Chamber of Commerce select committee has existed since under the name "the USDA Committee".

In early 1977, the USDA committee contacted Senator John L. McClellan, Senator Dale Bumpers, Congressman John Paul Hammerschmidt, Congressman Bill Alexander, Governor David Pryor, Attorney General Bill Clinton, State Senator Clovis Bryant, State Representative Frank Willems, MRDDS Board, and Drs. James Martin and Lloyd Warren of the University of Arkansas to promote the creation of a Small Farms Research Center. All of these individuals were instrumental in securing funds and developing the Center. In 1978, an Act of the U.S. Congress authorized and allocated funds for a task force to consider the feasibility of establishing a center at Booneville, Arkansas. The feasibility study was completed in March 1979 and recommended the creation of a Small Farm Research and Extension Center to serve the needs of small farmers in the mid-south region of the U.S. The task force decided the initial research thrust at the Small Farms Research Center would be: (1) a livestock-forage research program; and (2) a small fruit and vegetable research program. Congress approved funds for the Center in 1979.

An agreement between the State of Arkansas MRDDS (BHDC) and the University of Arkansas made available 1,660 acres for leasing by USDA/ARS. Since January 1980, the Small Farms Research Center has been a partnership of the University of Arkansas/Division of Agriculture and USDA/ARS. In 1980, temporary offices were established downtown in Booneville until office space was made available on the leased property. In October 1980, there was a ground breaking ceremony to celebrate the establishment the Research Center on State Highway 23 about 6.5 miles southwest of Booneville.

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Actual Center development began in the spring of 1981. The Center continues to grow as evident by the construction of 3 cattle working facilities over the last 3 years.

Over the years, the name has changed from South Central Small Farms Research to South Central Small Farm Research Center, to South Central Family Farm Research Center to Dale Bumpers Small Farms Research Center (DBSFRC) in 1997. The small fruit and vegetable program at the Research Center was phased out between 1986 and 1990 as a larger horticultural program was established nearby at the ARS South Central Agricultural Research Laboratory in Lane, OK. In 1990, Congress directed the creation of an agroforestry research program at the Research Center. So since 1990, the Center's two major research programs have been agroforestry and forage-livestock production. Through the 1990's, Congress appropriated funds to create cooperative projects between the DBSFRC and University of Arkansas, University of Missouri at Columbia and Oregon State University. The objectives of these cooperative projects are to find ways of reducing economic losses to tall fescue toxicosis and increase small farm profitability by the production of high value products via agroforestry systems. Agroforestry is an intensive land management plan in which agricultural and forest products are co-produced.

In December 1982, the USDA Committee met with USDA, Soil Conservation Service (SCS) representatives to discuss the establishment of a Plant Materials Center (PMC) at the Small Farms Research Center. In January 1983, a proposal was written and a resolution passed by the Arkansas Soil and Water Commission supporting the establishment of the PMC at Booneville. In March 1983 the proposal was sent to the SCS Chief and in June the Arkansas Congressional Delegation in Washington gave the project its complete support. In 1984, the Agricultural Appropriation Bill contained instructions for USDA to review the proposal of a PMC at Booneville.

Funds were unavailable for the PMC until Congress appropriated funds in August 1986. In 1987 an agreement was made between ARS and SCS to lease office facilities and acreage. Therefore since 1987, the Small Farms Research Center has been a three institution partnership, which today includes USDA/NRCS, USDA/ARS and University of Arkansas/Division of Agriculture. Although the mission and objectives of the three institutions are different, all three institutions are keenly interested in addressing the needs and problems of smaller scale farmers and ranchers.

In February, 2000, the Center hosted a gathering of local farmers and extension agents to hear what the Center could do to increase its effectiveness. Overwhelmingly the participants stated that the transfer of research results from the Center to users was not occurring to a sufficient extent. To overcome this problem, the Center has committed itself to producing this newsletter, hosting an annual field day starting in May, 2001 and increasing its participation in local and regional agricultural events. Themes for the first year of the newsletter are:

Fall 2000-	Livestock production
Winter 2000-	What farmers want from the Center and ARS
Spring 2001-	Livestock production
Summer 2001-	Agroforestry
Fall 2001-	Managing soil fertility

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Senepol cows raise big calves on tall fescue

Introduction. Cattle grazing tall fescue infected with endophytic fungus tend to develop an assortment of disorders collectively known as tall fescue toxicosis. The toxicosis is caused by ergot alkaloids produced by the endophytic fungus living in the host tall fescue. It is estimated that tall fescue toxicosis reduces cattle production by \$600 million in the United States, with most of these losses being incurred by producers in the southeastern states. Most of the losses in Arkansas due to tall fescue toxicosis result from the summer syndrome. Cattle with summer syndrome have increased body temperature, and reduced milk production, feed intake, growth and reproductive performance.

The use of heat tolerant cattle is one management tool that cattlemen can use to reduce the impact of tall fescue toxicosis. Studies over many years at DBSFRC in Booneville, AR have demonstrated that Brahman cattle can significantly improve the production of weaned calves in a cow-calf operation, in part because Brahman cattle are more heat tolerant. Calves from Brahman/Angus and Brahman/Hereford crossbred cows produced more pounds of weaned calves when continuously grazing tall fescue than calves from purebred cows. However, incorporation of Brahman cattle into the breeding program of a cow-calf operator may not improve the profitability. Brahman crossbred calves usually sell at discounted prices at sale barns in AR. Purebred and crossbred Brahman cattle tend to

mature later. This increase in time to breeding age increases the cost of production.

There are alternatives to Brahman for increasing the heat tolerance of cattle. One example of such a breed is Senepol. Senepol breed was developed on the Caribbean Island of St. Croix. In the 1800's N'Dama cattle were imported to St. Croix from Senegal. In 1918, one of the largest N'Dama breeders, Henry Nelthropp, introduced Red Poll genetics into the N'Dama. The Senepol breed developed from cross-breeding Red Poll and N'Dama and selecting for early maturity, maternal efficiency, polled, solid red color, heat tolerance and gentle disposition. The Senepol breed was first introduced into the U.S. in 1977. Further information about Senepol cattle can be found on the internet at www.senepolcattle.com/scba/Index.cfm.

Previous research has confirmed that Senepol cattle are more heat tolerant than Angus and Hereford cattle. Senepols appear to have certain advantages over Brahman. USDA carcass quality and yield were not significantly different for steers from Senepol and Hereford dams when fed out in the feedlot. Senepol cattle tend to mature as quickly as Angus and Hereford cattle. The performance of Senepol cattle in cow-calf operations has not been evaluated much outside of the subtropical regions of the United States, i.e. Texas and Florida. The objective of this study was to evaluate the performance of Senepol cattle in a cow-calf operation where tall fescue is the predominant forage.

Cattle and Forage Management. Calf production by approximately 100 Angus, Hereford, Brahman and Senepol cows was evaluated at DBSFRC in Booneville, AR in 1997 through 1999. At DBSFRC over the last ten years, highest adjusted weaning weights were routinely obtained with Brahman cows grazing common bermudagrass. Therefore, such a treatment was included as a control. Calves were born from middle of February through May. Bull calves were castrated. Calves were weaned in the middle of October. Weaning weights were adjusted to 205 days. Cows were bred to bulls with a breeding season of 75 days from May to July.

Tall fescue pastures received 50 and 80 pounds N/acre in October and the second half of February, respectively, each year. Tall fescue pastures were routinely sprayed with 2,4 D at 1 pound/acre in March to minimize the growth of dicot weeds. Bermudagrass pasture received 60 and 80 pounds of N/acre in May and July. Cattle were stocked to achieve about 1 cow-calf pair per 2 acres of pasture. During the winter months when forage availability was low, cattle grazing tall fescue were fed tall fescue hay while cattle grazing

bermudagrass were fed bermudagrass hay. Cattle had free access to a commercial salt/mineral mix year round.

Results. The objective of this experiment was to assess the effects of cattle breed on calf production for cows grazing tall fescue year round when forage availability was not limiting. Calf production by Brahman cows grazing bermudagrass was included as a control. The percentage of cows weaning a calf averaged about 90% over the 3 years of this study. The percentage of cows weaning a calf did not differ among breeds.

Calves born to Brahman cows grazing bermudagrass in the spring of 1997, 1998 and 1999 averaged 535 pounds at weaning (weight adjusted to 205 days). The months of July and August in 1998 and 1999 were drier and hotter than normal, and weaning weights were lower in 1998 and 1999 as compared to 1997. Weaning weights for calves born to Brahman cows grazing tall fescue averaged considerably less, 470 pounds over the three years. Weaning weights for calves born to Angus and Hereford cows grazing tall fescue were less than that of the Brahman, averaging 441 pounds. However, calves weaned from Senepol cows grazing tall fescue weighed about the same as those from Brahman cows grazing bermudagrass, 531 pounds.

In addition to raising big calves, the Senepols at DBSFRC were easy to work, i.e. good personalities. They look very much like European breeds of cattle, coming close in appearance to Red Angus. DBSFRC no longer has its Senepol. They were sold after the experiment was terminated in the fall of 1999. However, the Kerr Center for Sustainable Agriculture in Poteau, OK uses Senepol crossbred cows in their research herd. The Kerr Center also has had good experiences using Senepol cattle, details of which are summarized in the accompanying article.

Effects of cow breed and forage on 205 day adjusted weaning weights at DBSFRC, 1997-1999.

<u>Breed of Cows</u>	<u>Forage</u>	<u>Weaning Weight</u> pounds
Brahman	Bermudagrass	535
Angus/Herefords	Tall Fescue	441
Brahman	Tall Fescue	470
Senepol	Tall Fescue	532

For additional information contact David Brauer and/or Wesley Jackson at DBSFRC.

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An agriculture student was eager to show off his education to a farmer. He looked at a nearby field and said to the farmer: "Those crops look terrible. I'd be surprised if you got five bushels of wheat per acre." After a few moments of silence, the old farmer drawled, "So would I, that's my corn field."

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Take heed: Good examples have twice the value of good advice.....If the grass looks greener on the other side, fertilize.

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SENEPOL: The new breed of the South, 10 Years of Experiences Lived and Learned at the Kerr Center for Sustainable Agriculture in Poteau, OK.

In 1990 a decision was made to evaluate a new breed as an alternative to Brahman (*Bos Indicus*) cattle. Our choice was Senepol (*Bos Taurus*). The breed made specific claims of: heat and insect tolerance, calving ease and mothering ability, excellent dispositions, carcass quality and marketability, and early sexual maturity. Our experience has been that this breed has met and exceeded these claims. Our intention was to complement Angus cows with traits that add diversity to their weakest traits, primarily heat and insect tolerance. Diverse breeds are used by cattlemen to exploit heterosis and complementarity in crossbreeding programs. In USDA research, Senepol crosses have expressed more heterosis than any combination of British x British or British x Continental crosses. We have also seen this to be the case in our herd.

Dealing with the heat and humidity is a fact we must always address but also effects of fescue. In our research we have seen the benefit of Senepol crossed with Angus while grazing fescue. The cattle visibly graze longer during the day than straight bred Angus which also shows up in daily gain superiority during the summer months. We observed significant differences in rectal temperature between breeds in 214 head of steers evaluated over 2 years. Senepol and Senepol crossbred steers had lower rectal temperatures. A lower rectal temperature is a good indicator of less heat stress.

Table 1. Carcass summary of Angus- and Senepol-cross steers 1995 to 1998.

Item	Means by Breed Groups		
	Angus	½AN x ½ Senepol	½SE x ¼AN x ¼ Gelbvieh
No. (head)	36	68	35
Finish Wt	1253	1254	1274
DP (%)	62.5	61.8	62.4
% Yield Grades 1&2	75	56	77
Marbling	6.0	5.1	5.5
%Choice	97	60	86
REA (sq.in.)	13.0	12.9	13.4
Back Fat (in.)	0.4	0.4	0.3
Gross (\$)	910	857	918

Table 2. Performance summary of Angus- and Senepol- cross steers 1995 to 1998.

Item	Means by Breed Groups		
	Angus	½AN x ½ Senepol	½SE x ¼AN x ¼ Gelbvieh
No. (head)	36	68	35
Weaning weight	568	558	572
Yearling weight	663	625	639
Feedlot ADG	3.89	3.60	3.89

The data in the above tables may not show all the benefits of Senepol. Fertility must remain a key component for profitability. We have seen tremendous improvements in moving our cattle to a 365 day calving interval by incorporating Senepol. Aspects of the early maturity has allowed us to develop heifers on very little inputs and ask them to calve at 24 months of age.

Summary: The crossing of Senepol on Angus- and Gelbvieh-cross cows produced a biological type that seems to be superior to straight Angus when steers are required to utilize infected fescue during a long-term backgrounding program. All breed groups had exceptional weight gains when placed on a short-term finishing program and a high percentage met industry standards for quality and yield grade. We generally recommend these biological types to anyone who retains

ownership of their cattle past weaning. This sets up the potential to take advantage of specific grid marketing programs like Certified Angus Beef™. The use of Senepol in crossbreeding systems seems to be a viable alternative for southern cow-calf producers. We have been so pleased with the benefit of the Senepol that we are trying to establish the Senegus composite which is $\frac{5}{8}$ AN x $\frac{3}{8}$ SE.

By Brian Freking. Brian is the Livestock Specialist at the Kerr Center. Information for contacting the Kerr Center is on page 7. *

A love-hate relationship with tall fescue

The paragraph below is a summary of an editorial and article describing recent research regarding tall fescue toxicosis that appeared in the July issue of *Agricultural Research*, the monthly magazine that ARS produces.

As tall fescue goes, so too goes Middle America, or at least 100,000 owners of small farms in the southeast. The Southeast's Tall Fescue Belt—stretching from Arkansas and Missouri to Georgia, North Carolina, South Carolina, and Virginia—coincides with a Small-Farm Belt. Any major improvements in fescue would have a significant impact on these farmers. They love fescue because they can practically plant it and forget it. The problem is that the reason fescue grows so well is also the reason farmers have a love-hate relationship with it: it's infected with a fungus. The fungus helps fescue survive tough conditions. However, the fungus-infected tall fescue produces toxins which cause a collection of disorders in grazing animals called tall fescue toxicosis.

ARS is proud to be a part of about a quarter century of research to help these farmers by lessening the impact of fescue toxicosis. Seed companies and universities, many working with ARS scientists, are closer to their goal of producing a persistent but less toxic tall fescue than ever before. The first commercial tall fescue variety with a more friendly, less toxic, form of the fungus will be available this fall. University of Georgia scientists in Athens, working with a seed company, developed the new variety, called MaxQ.

The issues involved in the tall fescue-fungus story are complex and no single solution will solve all the problems. There are countless acres where infected tall fescue will not be replaced by friendly-fungus or fungus-free tall fescue. In those cases, research is needed

on how to manage livestock and forages to minimize the impact of fescue toxicosis.

Full text versions of both the editorial and article are posted on the world wide web at www.ars.usda.gov/is/AR/. Subscriptions to *Agricultural Research* can be requested by mail at New orders, Superintendent of Documents, POB 371954, Pittsburgh PA 15250-7954 or phone at 202-512-1800

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Feeding Corn to Stockers on Bermudagrass Pasture can Cost-Effectively Boost Weight Gains

Bermudagrass is an excellent perennial grass for pastures with good drainage and moderate fertility. Popularity of this grass is due to its productivity with sufficient moisture and typically moderate forage quality in the early to middle growing season. A problem with bermudagrass, however, is that weight gains of cattle can drop substantially as forage quality declines in the latter part of the growing season. A possible solution to this problem is to offer grain concentrates to overcome nutrient deficiencies, provided they can be offered in amounts that produce cost-effective increases in weight gains.

Studies conducted at DBSFRC evaluated the benefit of feeding small quantities of grain supplements to stocker steers. A grazing experiment was conducted in the 1993 and 1994 to determine if protein supplementation can enhance average daily gains (ADG). Soybean-cottonseed meal (50:50) was fed to yearling steers at a rate of 1 lb/steer/day on bermudagrass. Bermudagrass had received split applications of ammonium nitrate in late April and early July (75 lbs. actual N/acre/application). ADG was slightly higher for supplemented (1.5 lb/day) than for those not supplemented (1.4 lb/day). The cost of the supplement for each added pound of daily gain was approximately \$1.07. Such an increase in daily gain with protein supplementation was not cost effective.

The crude protein levels in the bermudagrass were at or above marginal levels for meeting steer growth requirements for most of the grazing season. Although crude protein gradually declined during the grazing season, there was a pronounced increase in crude protein following the second application of N fertilizer in the middle of the grazing season. Total digestible nutrients declined to levels that were less than 50% later in the

grazing season. These analyses strongly suggested that weight gains on bermudagrass are limited more by energy than by protein. The next logical step was to determine the cost effectiveness of feeding ground corn as an energy supplement.

Another grazing experiment was conducted in 1998 and 1999 to evaluate the effects of daily consumption of ground corn (consumption rates = 0, 1, 3, and 5 lb/steer/day) on the ADG of steers grazing bermudagrass. There were marked increases in ADG as corn supplement levels increased up to 3 lb/day (0 consumption rate = 1.86 lb/day; 1 consumption rate = 2.14 lb/day; 3.0 consumption rate = 2.63), but there was no increase between the 3 and 5 (2.58 lb/day) lb/day rates. The cost of ground corn for each added pound of daily gain with a corn cost of \$150.00 per ton was \$0.22 for the 1 lb consumption rate, \$0.31 for the 3 lb consumption rate, and \$0.54 for the 5 lb consumption rate. The 1 and 3 lb rates are therefore feasible for most cattle and corn market scenarios.

Weight gains were generally higher for the corn supplementation study than for the protein supplementation experiment. This was, in part, because steers used in the corn supplementation experiment were implanted with anabolic agents whereas those used in the protein supplementation were not implanted. Other factors, such as genetics and prior management, also likely influenced the differences in steer performance between the two experiments.

Results of the corn supplementation study showed that economical increases in steer weight gains can be achieved on bermudagrass by feeding 1 to 3 pounds of ground corn daily per animal. It should be mentioned that split applying N fertilizer during the grazing season is likely needed to observe a benefit in supplementing with ground corn. Crude protein would likely be deficient with single and/or low applications of N and, therefore, either a protein supplement or greater amounts of corn would have to be fed to obtain the benefits in weight gain. This research demonstrates that the knowledge of changes in the quality of forages through a growing season can pin-point the type of supplementation that animals actually need for cost effective gains.

For additional information contact Glen Aiken and/or Sam Tabler at DBSFRC. *

Dale Bumpers Small Farms Research Center is a partnership among three institutions:

ARS- conducts research related to livestock production and agroforestry; ARS staff can be reached at 501-675-3834.

PMC/NRCS- evaluation of vegetation and vegetation technology to retain soil and its productive capability; NRCS staff can be reached at 501-675-5182.

Division of Agriculture/University of Arkansas- dissemination of agricultural information. Extension Specialist, Billy Moore, can be reached at 501-675-5585.

ARS Scientists at DBSFRC and their primary research focus

David Brauer- Agronomist/Research Leader investigating both agroforestry and livestock production

Glen Aiken- Agronomist investigating production practices for stockers

David Burner- Agronomist investigating agricultural production in agroforestry systems

Joan Burke- Animal Scientist investigating reproductive performance in cattle and production practice for hair sheep

Dan Pote- Soil Scientist investigating the effects of management practices on sediment and nutrient retention in agroforestry and livestock production systems

If you did not receive this newsletter by mail and would like to do so, please contact the Center and we will place you on our mailing list.

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Organizations promoting agriculture in the Ozark Region

The information below is not an exclusive list of organizations trying to help farmers and ranchers in the Ozarks. If your organization is interested in being included, please contact David Brauer.

Poultry Production and Product Safety Research Unit (PPPSRU)/ARS/USDA/Center of Excellence for Poultry Science is located on the campus of the University of Arkansas in Fayetteville. PPPSRU conducts research to solve problems related to: 1) diseases and

physiological disorders that are of economic important to the poultry industry; and 2) land application of waste from the poultry production. PPPSRU can be reach at by phone at 501-575-4202 or by the world wide web at www.uark.edu/~usdaars/.

South Central Agricultural Research laboratory (SCARL)/ARS/USDA conducts multi-disciplinary research for developing technologies to establish and sustain production and post harvest quality of alternative crops such as vegetables, small fruits and kenaf. The Laboratory is co-located with the Oklahoma State University's Wes Watkins Research and Extension Center in Lane, OK. SCARL can be reached by phone at 580-889-7395 or by the world wide web at www.lane-ag.org.

The Kerr Center for Sustainable Agriculture in Poteau, OK offers leadership and educational programs to those interested in making farming and ranching environmentally friendly, socially equitable, and economically viable. The Kerr Center can be reached by phone at 918-647-9123, by email at mailbox@kerrcenter.com or on the web at www.kerrcenter.com.

ATTRA, Appropriate Technology Transfer for Rural Areas, is the national sustainable agriculture information center. ATTRA provides technical assistance to farmers, Extension agents, market gardeners, agricultural researchers, and other ag professionals. ATTRA is located in Fayetteville, AR. ATTRA staff members prefer to receive request for information via 800-346-9140. ATTRA maintains a web site at www.attra.org

The Good Grazer Group (GGG) is a network of livestock producers mainly from northwest Arkansas but includes producers from many other states including Virginia, Missouri, and Oklahoma to name a few. GGG maintains a electronic mailing list on which members routinely share information and opinions regarding various topics on forage management and livestock production. Members meet monthly, most times at a member's farm, to see and discuss information related to grazing practices. Individuals interested in joining the GGG should contact Ann Wells at annw@ncatark.uark.edu.

Information regarding the ***Arkansas Cooperative Extension Service and the Division of Agriculture*** can

be found on the internet at the following web site: www.uaex.edu.

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Attention Sheep Owners:

Farm Service Agency has a new program to help sheep producers be more competitive in the world lamb meat market. Funds are available to help offset expenses from buying rams and facility improvements (sheds, fences, etc.). If you are interested, inquire at your local Farm Service Agency. If your local office is unfamiliar with the program, ask for Form FSA-382.

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